Yiming Che

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PROFESSIONAL SKILLS & KNOWLEDGE

- **Programming Languages:** Python, Matlab, R

- **Skills:** Linux, Slurm, Git, MySQL, Bash script

- **Research Interests:** Generative models, Medical imaging, Bayesian statistics, Active learning

EDUCATION BACKGROUND

- **Binghamton University, State University of New York, NY, United States**
  Department of Systems Science and Industrial Engineering
  Doctor of Philosophy in Systems Science   May 2023
  Advisor: Dr. Changqing Cheng

- **Binghamton University, State University of New York, NY, United States**
  Department of Systems Science and Industrial Engineering
  Master of Science in Industrial Engineering   May 2018

- **Capital University of Economics and Business, Beijing, China**
  Department of Industrial Engineering
  Bachelor of Science in Industrial Engineering   July 2017

PROFESSIONAL EXPERIENCE

- **Postdoctoral Scholar at Arizona State University** (Advised by Dr. Teresa Wu)   2023-Present

  - **Weakly-supervised Brain Tumor Segmentation**
    - Developed a weakly-supervised brain tumor segmentation framework using diffusion models
    - Proposed a novel hyperparameter selection method without ground truth
  - **Interpretable Medical Image Classification**
    - Trying to utilizing diffusion models as interpretable medical image classifier with conterfactual
  - **Multi-modality Fusion for Headache Diagnosis**
    - Utilized CLIP model for multi-modality fusion in headache diagnosis
  - **Biomedical Age Prediction with Epigenetic Data for Alzheimer's Disease Detection**
    - Prepared NIH RO1 grant proposal
    - Utilized Cycle-GAN model for epigenetic data translation
    - Utilized epigenetic data for biomedical age prediction

- **Research Assistant at Binghamton University** (Advised by Dr. Changqing Cheng)   2019-2023

  - **COVID Outbreak Prediction**
    - Physics-informed neural network (PINN) for the prediction of COVID outbreak
      - Included Bayesian framework in traditional PINN for robust prediction
  - **Surrogate Modeling and Active Learning/Sequential Design**
    - Developed a novel surrogate model which combines generalized polynomial chaos and stochastic kriging model for efficient surrogate modeling of stochastic systems
      - Significantly reduced computational budget and without loss of accuracy

- Developed single-section and batch-selection sampling algorithms with Gaussian process
  - Significantly reduced the size of training set for efficient surrogate modeling
- **Uncertainty Quantification for Machining Process**
  - Developed uncertainty quantification framework using generalized polynomial chaos expansion for machining process
    - Reduced computational budget of time-domain simulations for uncertainty quantification

AWARD & HONOR

- 2023 Distinguished Dissertation Award, Binghamton University   2024
- Excellence in Systems Science Research Award, Binghamton University   2023
- Graduate School Travel Grant, Binghamton University   2022
- INFORMS Bonder Foundation Award   2021
- Finalist, IISE-DAIS Mobile App Competition at 2021 IISE Annual Conference and Expo   2021
- Binghamton University Graduate Student Excellence Award in Research (**top 1%**)   2021
- Travel Grant of Midwest Dynamical Systems Conference 2019, University of Illinois at Chicago 2019
- Second Place, Best Student Paper Competition at 2019 IISE Annual Conference and Expo (Healthcare track)   2019
- Honorable Mention, Binghamton University Research Day Poster Competition, 2018   2018
- National Scholarship, Capital University of Economics and Business   2015

WORKING PAPERS

1. Unsupervised headache subtype discovery using diffusion model

2. FBP and PiB tracer agreement in amyloid PET using modified Cycle-GAN model

3. Enhanced traumatic brain injury recovery classification with harmonized brain MRI and CT

4. Improving headache detection on small T1-weighted MR dataset using pretrained large-scale contrastive language-image model

PUBLICATIONS

1. Shah, J., Krell-Roeschc, J., **Che, Y.**, Forzanie, E., Knopmanf, D.S., Cliff, R.J., Petersenc, R.C., Wu, T. and Geda, Y.E. "Predicting cognitive decline from neuropsychiatric symptoms and Alzheimer's disease biomarkers: A machine learning approach to a population-based data" *Journal of Alzheimer's Disease* (Under review)

2. **Che, Y.**, Rafsani, F., Shah, J., Siddiquee, M. M. R. and Wu, T. "AnoFPDM: Anomaly segmentation with forward Process of diffusion models for brain MRI" (submitted to WACV 2025).

3. Wan, J., Kataoka, J., Sivakumar, J., Pena, E., **Che, Y.**, Sayama, H. and Cheng, C. "Sparse Bayesian learning for sequential inference of network connectivity from Small Data" *IEEE Transactions on Network Science and Engineering* (In press)

4. **Che, Y.**, Muller, J. and Cheng, C. "Dispersion-enhanced sequential batch sampling for contour estimation," *Quality and Reliability Engineering International* 40 (2024): 131–144. https://doi.org/10.1002/qre.3245

5. **Che, Y.** and Cheng, C. "Physical-statistical learning towards resilience assessment for power generating systems," *Physica A: Statistical Mechanics and its Applications* 615 (2023): 128584. https://doi.org/10.1016/j.physa.2023.128584

6. Ma, Q., **Che, Y.**, Cheng, C. and Wang, Z. "Characterizations and optimization for resilient manufacturing systems with considerations of process uncertainties," *Journal of Computing and Information Science in Engineering* 23.1 (2023): 1-30. https://doi.org/10.1115/1.4055425

7. Wan, J., **Che, Y.**, Wang, Z. and Cheng, C. "Uncertainty quantification and optimal robust design for machining operations," *Journal of Computing and Information Science in Engineering* 23.1 (2023): 0110005. https://doi.org/10.1115/1.4055039

8. **Che, Y.** and Cheng, C. "Active learning and relevance vector machine in efficient estimate for basin stability of dynamic networks," *Chaos: An Interdisciplinary Journal of Nonlinear Science* 31.5 (2021): 053129. https://doi.org/10.1063/5.0044899.

9. **Che, Y.**, Guo, Z. and Cheng, C. "Generalized polynomial chaos-informed efficient stochastic Kriging," *Journal of Computational Physics* 445 (2021): 110598. https://doi.org/10.1016/j.jcp.2021.110598.

10. Wu, X., Zheng, Y., **Che, Y.** and Cheng, C. "Pattern recognition and automatic identification of early-stage atrial fibrillation," *Expert Systems with Applications* 158 (2020): 113560. https://doi.org/10.1016/j.eswa.2020.113560.

11. **Che, Y.**, Cheng, C., Liu, Z. and Zhang, Z. "Fast basin stability estimation for dynamic systems under large perturbations with sequential support vector machine," *Physica D: Nonlinear Phenomena* 405 (2020): 132381. https://doi.org/10.1016/j.physd.2020.132381.

12. **Che, Y.**, Liu, J. and Cheng, C. "Multi-fidelity modeling in sequential design for identification of stability region in dynamic time-delay systems," *Chaos: An Interdisciplinary Journal of Nonlinear Science* 29.9 (2019): 093-105. https://doi.org/10.1063/1.5097934.

13. **Che, Y.** and Cheng, C. "Uncertainty quantification in stability analysis of chaotic systems with discrete delays," *Chaos, Solitons & Fractals* 116 (2018): 208-214. https://doi.org/10.1016/j.chaos.2018.08.024.

PROFESSIONAL SERVICES

- Conference Reviewer
  - Medical Image Computing and Computer Assisted Intervention (MICCAI)
  - International Conference on Automation Science and Engineering (CASE)

- Journal Reviewer
  - Physica D: Nonlinear Phenomena

- Student member, Student leadership board at IISE   Mar. 2021-2022

- Vice president, ASQ Binghamton chapter   Aug. 2019-2022